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ABSTRACT

An experiment was conducted to test the hypothesis that recent theories connecting creative problem solving with cerebral specialization might explain why some writers compose much more effectively than others. Specifically, the experiment was designed to find ways composition teachers can help students to transform writer-based prose into reader-based prose. Ten subjects were involved, two as controls and eight as active participants, four experienced and four inexperienced writers. They wrote for an hour and fifteen minutes while producing a thinking-aloud protocol that was taped, transcribed, and carefully analyzed. An attempt to chart the protocol's data on flexibility and persistence according to left hemisphere/right hemisphere analogs produced incongruity until it became clear that there were actually two flexibility sets and two persistence sets interacting with hemispheric activity. This finding produced a model of four separate, more-or-less effective composing/problem solving processes, based on the various combination of these sets. These results suggest several pieces of practical advice for composition teachers concerning, among other things, heuristics, framing techniques, meditation, and autobiographical and expressive prose. (Several charts and graphs are included.) (JL)

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Writer-Based Prose, Creativity Research and Protocol Analysis

Richard M. Collier

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Writer-Based Prose, Creativity Research and Protocol Analysis

by Richard M. Collier

If I recall correctly, I was working in my garden separating the carrots from the weeds and discovering now and then a delicious and unexpected strawberry when it suddenly occurred to me that recent theories connecting creative problem solving with cerebral specialization might help explain why some writers are able to compose effectively and some are hardly able to communicate at all. I have had stranger thoughts in stranger places, and the more I considered the matter the less bizarre it all seemed: the context for this idea seemed mysteriously to reflect the idea itself. Later, while I was rereading Linda Flower's 1979 article on the cognitive basis for problems in writing in which she cogently analyzes the distinction between writer- and reader-based prose, this hypothesis floated again to consciousness and received further illumination. As well, I had, rather serendipitously, enrolled that spring in the Flower and Hayes seminar at Carnegie-Mellon University on research in writing, and acquired a sufficient understanding of protocol analysis to design a modest experiment which I hoped would verify my intuitions. There had been more growing in my garden than I imagined.

Creativity research has long speculated on the differences between the highly creative individual and the less creative in regard to problem solving process and personality. A review of the literature of psychology suggests that there is considerably more agreement among the experts on the attributes of the low creative person than on the attributes of the high creative. In the left-hand column of the following chart I have attempted to summarize these attributes and partially adapt them to the composing process:

Attributes of the Low Creative Individual

<u>Attributes</u>	<u>Protocol Analogues</u>
I. Cognitive Qualities	
A. Unproductive	A. Few ideas; resists problem
B. Rigid	B. Is locked early into a preconceived set or frame; rejects ideas that do not fit
C. Overuses convergent thinking	C. Proceeds linearly through writing task
D. Narrow scope of concerns and interests	D. Sees few possibilities in problem

Attributes

- E. Reduced associational and expressional fluency
- F. Early goal decisions: needs quick solution; does not explore extensively
- G. Early closure on subordinate problems; does not incubate ideas
- H. Is either primarily abstract or primarily concrete: little integration
- I. Uses logic and reasoning processes improperly or too early
- J. Does not see unresolved problems, larger aspects of the topic, implications, ambiguities, contradictions or conflicts in ideas or propositions

II. Originality

- A. Repeats and builds thinking on accepted ideas, dogma, etc.; is not novel or unique
- B. Finds only conventional associations and relationships
- C. Never quite grasps core of problem
- D. Spends most of her time synthesizing
- E. Little or exclusive use of personal experience
- F. Little access to unconscious; intuition is limited to trivial matters
- G. Concerned primarily with wording, not meaning

Protocol Analogues

- E. Narrow range of references and terminology
- F. Decides early on frame and format; few notes or drafts; minimizes problem
- G. Rarely returns to earlier concerns; examines few alternatives
- H. Writing does not shift levels of abstraction
- I. (Various Indicators)
- J. Accepts first production; minimizes problem; has "tunnel vision"; does not ask questions; includes distortions; overlooks omissions

- A. Uses cliches and stereotypes
- B. Uses literal language only; fixes ideas in language early
- C. Omits significant concerns
- D. Heuristic techniques are aimed at achieving a final product
- E. Too much or too little autobiographical reference; too much or too little abstraction
- F. No expressions of discovery; no "eureka" exclamations
- G. Repeats and rereads frequently; labors over wording concerns

Attributes

Protocol Analogues

III. Evaluation

- | | |
|--|---|
| A. Highly Judgmental of work (often at an early stage) | A. Many negative, critical comments or many unfounded positive comments ("sounds good") |
| B. Is insufficiently objective: too little distance | B. Expressions of opinion equated with substantiation |
| C. Too skeptical <u>or</u> not skeptical enough | C. Frequent statements of doubt <u>or</u> few statements of doubt |
| D. Overly methodical | D. Orderly (rule-bound) procedure |
| E. Reliance on precept and prescription | E. Focuses attention on surface structure and diction |
| F. Little analysis | |
| G. Conservative | G. Repeats and replaces, but rarely deletes (but see IV.B.) |
| H. Does not verify extensively or accurately | H. Rereads for diction and syntactic orientation, not for meaning |

IV. Affective Qualities

- | | |
|---|---|
| A. Little access to feelings | A. Few expressions of emotion |
| B. Methodically constructive; spontaneously destructive | B. Linearly productive; tears out page and starts over |
| C. Usually quite serious; little sense of play or humor | C.  Expressions of wanting to quit or finish |
| D. Displays either great anxiety, worry or indifference. | D.  |
| E. Approach is often fragmented; lack of concentration | E. Writing is done in bits and pieces; finishes early |
| F. Is either overly careful of the inconsequential <u>or</u> careless | F. Very neat <u>or</u> very messy; few alterations |
| G. Lack of confidence | G. Statements of doubt and hesitation; questions ability; uses apologetic camouflage; "I don't know" |
| H. Lack of energy and enthusiasm | H. Monotone discourse |

Because this list and the others which follow are condensations and because creativity is a less than logically constituted phenomenon, the information presented may seem to be inaccurate and even contradictory. Nevertheless, these charts have proved to be useful even if rather blunt instruments, for drawing generalized por-

traits. A quick review of the attributes listed in the left-hand column provides at least intuitively a characterization of the less creative individual and, more particularly of the less experienced and less able of our writing students. The significance of the protocol analogues in the right-hand column will be explained when we come to discussing the experiment itself.

Because what happens during significant creative activity is, of course, extremely complex, even mysterious, deriving a matrix of attributes for the high creative individual and her problem solving process proved to be much more difficult than simply finding the converse of those listed for the low creative person. In fact, several attempts to draw up such a list resulted in what appeared to be unreconcilable contradictions. These contradictions were, however, resolved, at least in part, by applying the suggestion of Eugene Raudsepp of the Princeton Creative Research Institute that creative activity consists of a productive oscillation between two seemingly opposed sets, Persistence and Flexibility. The following two charts summarize and extend his classification of attributes:

Attributes of the Persistence Set

<u>Attributes</u>	<u>Protocol Analogues</u>
I. Convergent Thinking	
A. Goal directed	A. Proceeds linearly; rejects unsuitable ideas; has a narrowed focus
B. Sense of purpose	B. Finds core of problem
C. Rational and logical	C. Follows a chain of reasoning, often back to first principles and forward to examples and consequences

Attributes

- D. Systematic closure
- E. Integration of abstract with concrete

II. Evaluation

- A. Makes judgments on her own work
- B. Is objective
- C. Is skeptical
- D. Is methodical
- E. Elaborates
- F. Explores and elaborates within the confines of a given matrix
- G. Guidance by rule, reason, and precept
- H. Engages in analysis
- I. Is conservative
- J. May include extensive exploration
- K. Verifies extensively

III. Affective Qualities

- A. Concentration, persistence, absorption in task
- B. Wary of feelings; wary of unconscious
- C. Attentive
- D. Serious
- E. Careful
- F. Confident
- G. Energetic

Protocol Analogues

- D. Expressions of finality
- E. Reorganizes at syntactic and semantic levels
- A. Evaluative comments
- B. Distances self from work; considers audience
- C. Asks questions
- D. Orderly examination of issues, constraints and materials
- E. Develops idea
- F. Takes a stand; determines the schema of the problem
- G. Refers to constraints and prescriptive advice
- H. Finds constituent parts; asks questions; makes fine discriminations
- I. Develops rather than deletes
- J. Closure is delayed; exploration is analytic and sequential (see Left Hemisphere Protocol Analogue III)
- K. Examines, questions, tests, writes and revises, changes words, extends meaning, rereads
- A. Spends a great deal of time on one task; does not switch focus
- B. Detached attitude
- C. Irrelevant thoughts excluded
- D. Lack of tonal inflection in voice
- E. Considers at length (pauses)
- F. Uses statements like "Yeah, that's it"; is emphatic
- G. Speaks quickly

Attributes of the Flexibility Set

Attitudes

Protocol Analogues

I. Divergent Thinking

A. Productive and flexible

A. Generates many different ideas; considers many alternatives; change point-of-view, frames and schema frequently; expresses acceptance attitudes

B. Large scope of concerns and interests

B. Global references; many connections to other fields; maps problem area thoroughly

C. Associational and expressional fluency

C. Produces a great many words, verbal and/or written (long protocols and/or texts)

II. Originality

A. Discovers the novel and unexpected

A. Exclamations of discovery and surprise

B. Finds unusual connections and relationships (bisociation)

B. Use of figurative language and images, especially metaphor

C. Able to discern core of problem

C. (Various Indicators)

D. Able to synthesize

D. Brings ideas together to form whole

E. Uses Janusian thinking

E. Considers polarities; finds converse, inverse, opposite often without need for resolution

F. Challenges accepted ideas and beliefs (even her own)

F. Asks questions, especially of her own propositions

G. Uses personal recollection and experience

G. Autobiographical references; personal anecdotes

H. Accepts guidance by the unconscious (intuition)

H. Expressions of insight, "felt rightness", surprise

I. Explores extensively

I. Long preparation stage: many notes, uses Pentad questions

J. Incubates appropriately

J. Shifts to new problem and returns to old later; uses a variety of "tricks" to keep from verbalizing (see right hemisphere protocol analogues III. A.)

III. Affective Qualities

A. Has access to feelings

A. Affective verbalization; talks about and expresses emotions.

Attributes

- B. Spontaneous and impulsive
- C. Plays with ideas; whimsical
- D. Sense of humor
- E. Freedom from petty restraints and concerns
- F. Moderate anxiety alternating with relaxation
- G. Femininity

IV. Other Attributes

- A. Sensitivity to unresolved problems
- B. Tolerates ambiguity, contradiction, conflict, paradox
- C. Aesthetic sensitivity

Protocol Analogues

- B. Untidy; disorderly production during exploration
- C. Expression of delight, enjoyment
- D. Laughter, puns, jokes
- E. Non-prescriptive; non-proscriptive
- F. Modulations in voice tone and pace
- G. Sensitivity to implication, connotation and affective overtones of what is said and written
- A. Expressions of dissatisfaction; asks and repeats questions
- B. Accepts sense of illogic, incoherence, and "groping" in work
- C. (Various indicators)

When solving a problem, the high creative individual alternates sets: first the flexibility set will be applied to the problem and then the persistence set. This oscillation may occur many times during the problem solving period, each set being employed with differential intensity and for various durations. If we graph this alternation we get, in a very general sense, a step function (Figure 1). Since each unit on the graph, whether horizontal or vertical, represents a uniform length of time, the alternation between persistence and flexibility becomes symmetrically skewed around the diagonal: when a problem is first confronted, flexibility attributes are employed extensively and persistence attributes play only a slight, although still important role; as the high creative person approaches resolution of the problem, the persistence set takes command and the flexibility set becomes a subordinate influence. This is, however, a very generalized schema; the actual process is a great deal more complicated since it is highly recursive. Most problems, particularly those being solved in writing, naturally subdivide into component parts, and an oscillation of sets is generated for each subdivision. These oscillations in miniature occur many times during the larger problem solving process, and take place simultaneously, overlappingly, interactively and hierarchically. As

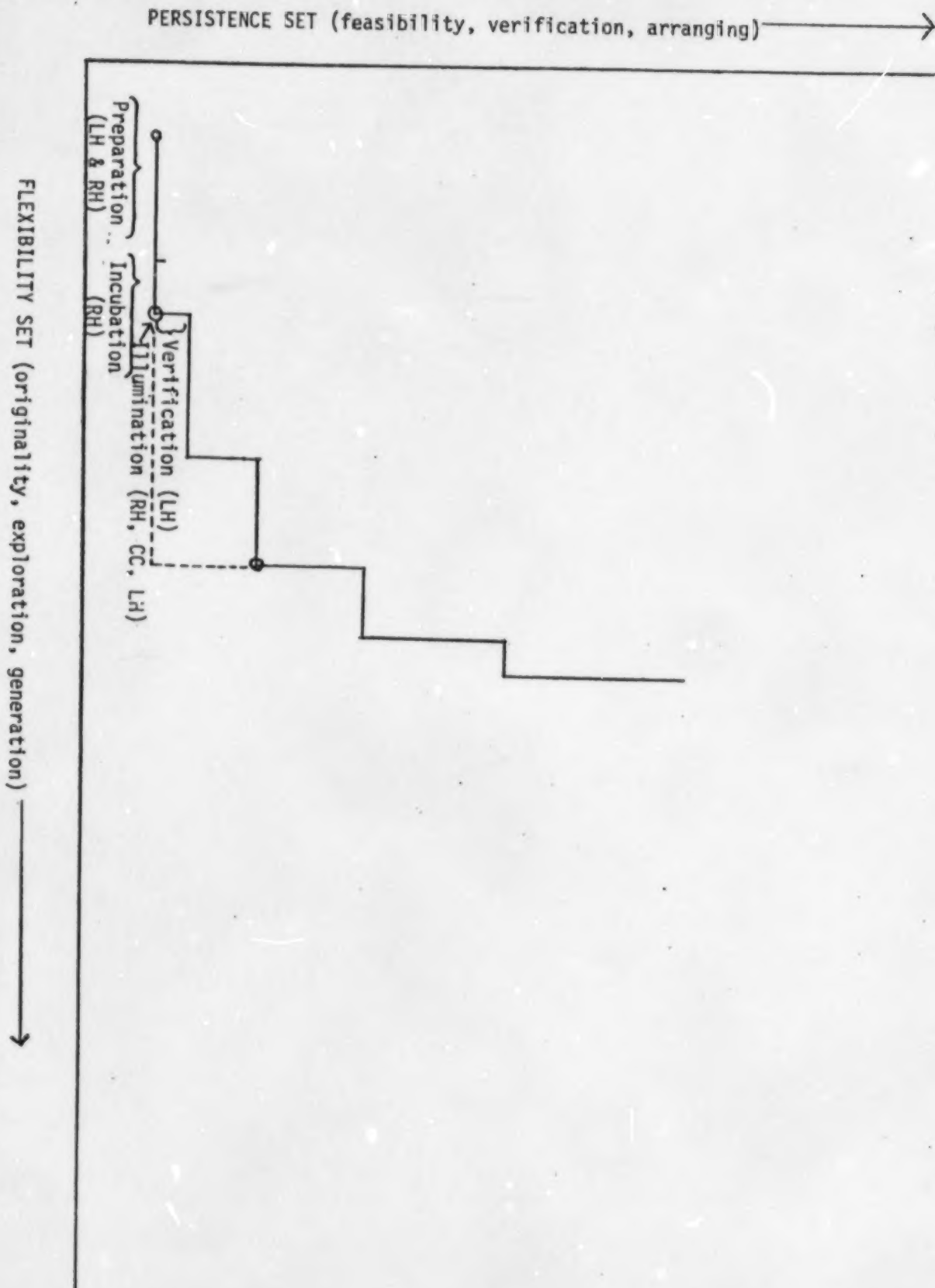


FIGURE 1

well, most creative thinkers, as we will see, adapt this paradigm to their own needs, so that for a particular individual working on a specific problem it may be quite idiosyncratic.

Graham Wallas' seminal work of 1926 in The Art of Thought becomes relevant here. Wallas suggested that creative problem solving could be viewed as taking place in four stages: a preparation stage, during which one finds, examines, explores and defines a problem, producing a "felt" map of the territory of dissonance; an incubation stage, during which the problem solver relaxes her attention from the difficulty at hand and either considers related but subsidiary problems or performs tasks, such as playing the violin or pulling weeds from the flower bed, which are completely different from the original matter, allowing the unconscious imagination in both instances to gestate the material already explored; the third stage is a point of illumination, at which suddenly and often unexpectedly a solution to the problem appears to consciousness; during the fourth stage, verification, "both the validity of the idea [is] tested, and the idea itself [is] reduced to exact form." The protocol analyses from the experiment itself strongly suggest that the attributes and activities of the flexibility set are those applied during the preparation and incubation stages, illumination is the point where the problem solver shifts from the flexibility set to the persistence set, and the verification stage is dominated by the persistence modality. Of course, I am probably once again oversimplifying matters: even though the problem solving process as a whole will resemble this paradigm, there may be several internal variations, the most important of which concern incubation. For example, when a problem solver incubates several matters simultaneously, illumination may flash forth for each at different and unexpected moments, punctuating each time whatever conscious exploration is taking place, and shifting her process at least briefly into the verification mode. This is shown by the dotted line on the graph in Figure 1.

Recent developments in the study of the brain and its functions would seem to corroborate these assertions. As you are already probably aware, the human brain is bisected into left and right hemispheres. The two halves are joined by the corpus callosum, a three-and-half inch long by one-quarter inch thick commissure, composed of upward of 250 million hetero- and homotopic nerve fibers. Studies of hemispherectomy patients, patients who have had one or the other of the two halves of the brain surgically removed, and of commissurotomy patients, those who have had all or part of their corpus callosum sectioned -- usually as a remedy for severe epilepsy -- suggest that the left and right hemispheres may receive different kinds of information, may possess different processing patterns, and may thus respond to the world in quite distinct fashions (Figure 11). Some authors have gone so far as to suggest that there is a separate and unique personality in each hemisphere. The following list summarizes, again quite roughly and approximately, what seems to be the present consensus on the diverse qualities and activities of the two halves of the brain, adapting them when possible to problem solving and the writing process:

Hemisphericity

I. Mode of Thought and Perception

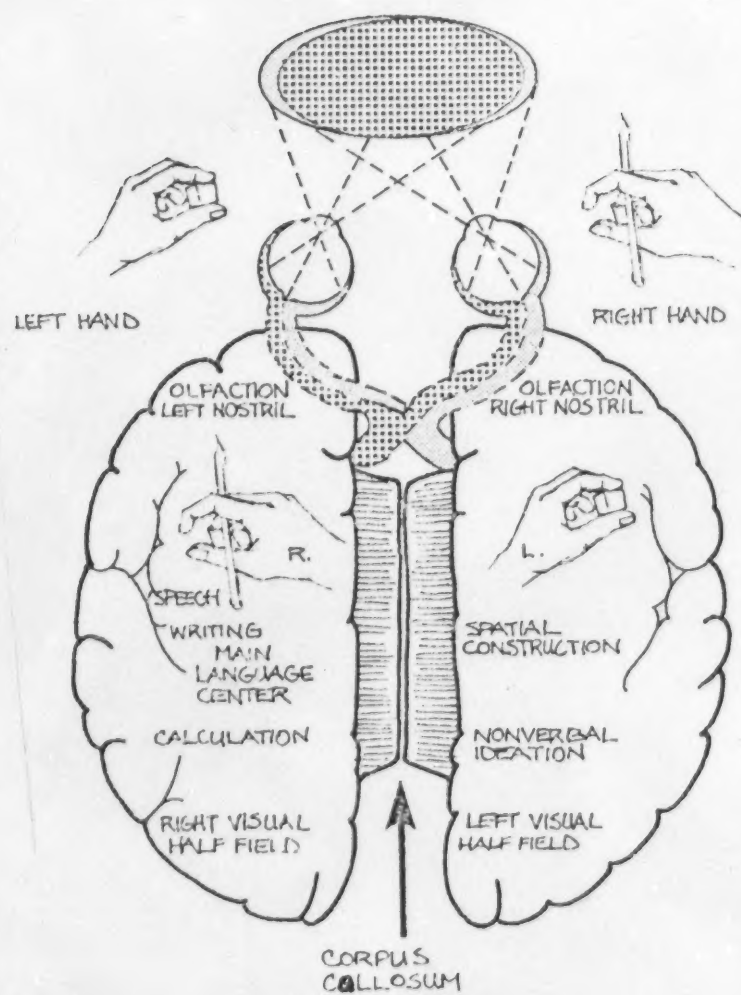
Left Hemisphere

- A. Logical thinking
- B. Follows linear, step-by-step sequences in a slow and systematic fashion
- C. Performs long chains of operations over time; capable of fine time discriminations
- D. Convergent thinking
- E. Deals with learned knowledge
- F. Mathematical and arithmetic
- G. Explicit and knowable thought processes

Right Hemisphere

- A. Associational: works by intuition and insight
- B. Holistic, pictorial-visual, spatial, relational abilities; simultaneous and parallel perception and processing; grasps situation in entirety and sees complete picture; gestalt oriented
- C. Immediate apprehension; cannot link items over time
- D. Divergent thinking
- E. Deals with tacit knowledge
- F. Geometric; poetic and imaginative qualities; creative force in art
- G. Mysterious thought processes

FIGURE II



II. Language

Left Hemisphere

- A. Has exclusive use of language (speech, reading, writing)
- B. Deals with words, phrases, syntax and format
- C. Forms propositions
- D. Shapes Ideas (constructs)
- E. Responsible for physical act of writing
- F. Recycles verbal material
- G. Provides verbal and semantic memory

Pre-Verbal, Non-Verbal, and Quasi-Verbal Activity

Right Hemisphere

- A. Is almost speechless and illiterate (except for expletives); deals with images, nonverbal matters, etc. which are inexpressible in language.
- B. Deals with subtle shadings and connotations of language
- C. Forms images, concept borders, fantasies, symbolization; acts as dream centre
- D. Generates (source of) Ideas
- E. Produces sketches, doodles, symbols, and diagrams
- F. Inner speech may dimly reflect activity of right hemisphere
- G. Visual and experiential memory (usually with a fragmented, snapshot quality)

III. Problem Solving

Left Hemisphere

- A. Responsible largely for preparation and verification stages
- B. Analyzes (dissects items into constituent pieces and properties)
- C. Deals in abstractions
- D. Abstract categorizing
- E. Serial tasks
- F. Stable, concerted attack on problem
- G. Inductive, deductive and enthymemic reasoning
- H. Processes familiar material (provided originally by right hemisphere)

Right Hemisphere

- A. Responsible for incubation and illumination stages
- B. Synthesizes (brings together items into a related whole)
- C. Deals in concrete terms
- D. Spatial perception
- E. Constructional and configurational tasks
- F. Groping, unordered, intuitionist approach
- G. Bisociation, metaphor, analogy, synectics, etc.
- H. Processes unfamiliar material

IV. Other Attributes

Left Hemisphere

- A. Is the conscious mind of psychoanalysis
- B. Regulates conscious processes
- C. Rational center
- D. Often positive, optimistic, and euphoric
- E. Intellectual qualities
- F. Capable of joking and humor
- G. Selective attention span (Intense but often interrupted)
- H. Voice tone is monotonous, colorless, and dull (left hemisphere does not interact with external environment)
- I. Concerned generally with detail
- J. Concerned with specific details in drawing
- K. Musical ability

Right Hemisphere

- A. Is the unconscious mind of psychoanalysis
- B. Preconscious mentality
- C. Emotional center
- D. Often negative, pessimistic, and dark
- E. The qualities of "soul"
- F. Capable of childlike playfulness
- G. Sustained attention (vigilance)
- H. Contributes tone, inflection, and melodic quality to speech
- I. Creates and understands pattern and organization
- J. Concerned with form in drawing
- K. Musical sense

V. Physical Correlates

- | | |
|------------------------|-----------------------|
| A. Right hand gestures | A. Left hand gestures |
| B. Eyes shift to right | B. Eyes shift to left |

Clearly the major features of this lateralization are that the left hemisphere is responsible for logical and sequential processes and for language, while the right hemisphere is associational, holistic, spatial, and nearly languageless (it is mute and illiterate, even though it may understand spoken language). The corpus callosum, which modifies as well as transmits information, mediates the working relationship ordinarily developed between the two hemispheres: If one hemisphere is better able to solve a problem, the other can be temporarily inhibited; control therefore passes normally to the hemisphere that can best do the job. For example, the left hemisphere would dominate when a person is working on a mathematical equation, while the right would dominate when she is practicing the piano or playing tennis. Referring once again to the graph of the problem solving paradigm

(Figure 1), we can see that ideally the preparation stage would involve both the left and the right hemispheres, while incubation would be exclusively a right hemisphere activity; the flexibility set is therefore composed primarily of right hemisphere functions. Illumination is the moment that non-verbal information from the right is permitted to pass over the corpus callosum to become conscious and eventually articulate in the left. Verification is almost entirely a left hemisphere activity; the persistence set is therefore composed primarily of left hemisphere functions. Unfortunately very few of us are ideal problem solvers and some of us, particularly our inexperienced writers, are not very good at it at all. What frequently seems to happen is that people attempting to solve a problem either use the wrong hemisphere at the wrong stage or habitually use one or the other hemisphere whether it is appropriate or not.

This brings us finally to writer-based and reader-based prose. On the next chart, I have attempted to summarize the contrastive features of these two types of prose:

Attributes of Writer-Based Prose and of Reader-Based Prose*

Writer Based Prose

1. Record of writer's verbal thought and of her discovery process
2. Associative pathways
3. Narrative structure or survey format (lists)
4. Use of "code words"
5. Shifting context for statements

Reader Based Prose

1. Prose is transformed to meet the readers' needs
2. Logical ordering
3. Structure determined by purpose and by nature of topic; intention determines arrangement; analytic and hierarchical organization
4. Elaboration, example and definition
5. Clearly delineated framework and purpose

- | | |
|---|---|
| 6. Features of inner, egocentric speech | 6. Shaped as a public utterance, using shared language |
| 7. Writes primarily for self | 7. Assumes, when appropriate, the point of view of audience |
| 8. Elliptical | 8. Developed and coherent |
| 9. Words are used personally and idiosyncratically | 9. Words are used according to public meanings |
| 10. Absence of logical and causal relations: juxtapositioning; simple linking; semi-independent networks, each with its own focus | 10. Coherence and pattern; shared context |
| 11. Complexes | 11. Concepts |
| 12. Reader must do most of the thinking, sorting, drawing out of details, abstracting essential features, discovery of pattern | 12. Writer organizes and clarifies appropriately |
| 13. Inclusion of irrelevant details | 13. Unified |
| 14. Audience is not considered | 14. Discourse is shaped to meet needs of audience |
| 15. "Memory dump" | 15. Material is selected and logically ordered according to a central controlling purpose |
| 16. Meaning of text is still largely in writer's mind (intentionality) | 16. Text is autonomous: product and intention are nearly identical |

*Adapted from Linda Flower, "Writer-Based Prose: A Cognitive Basis for Problems in Writing," College English, 41, No. 1 (1979), 19 - 37

Ordinarily the experienced writer produces reader-based prose and the inexperienced writer produces writer-based prose. Why the difference? Is it a matter only of writing and perhaps life experience or is there hope of other remedies? Does the experienced writer utilize the oscillation between flexibility and persistence sets more efficiently, and integrate the functions of left and right hemispheres in a more appropriate manner than the inexperienced writer? And most importantly how can we, as teachers of composition, help our students learn to transform their writer-based prose into reader-based prose?

The experiment I designed addressed these questions and has produced some tentative answers. I selected ten subjects, two as controls and eight as active participants. Of the eight, four were experienced writers and four were inexperienced writers; each group included two male and two female subjects. All ten subjects were required to write for an hour and fifteen minutes and to provide during this time a verbal or thinking aloud protocol, each of which produced an extensive record of what he or she was thinking and doing during the session. These monologues were taped, transcribed, and carefully analyzed. There were two writing assignments, each defining topic, purpose, audience and medium; the assignments were distributed symmetrically for each group. The protocol analogues in the right-hand columns of pages 1-7 define the text features which emerged as more or less distinctive for identifying the low creative individual, persistence set engagement and flexibility set engagement. The text features for writer- and reader-based prose, and to a large extent their attendant protocols, are listed on p. 15. The following chart suggests the protocol analogues for left and right hemisphere engagement:

Protocol Analogues for Left/Right Hemisphere Activity

1. Mode of Thought and Perception

Left Hemisphere

A. Use of logic

Right Hemisphere

A. Visual references, pictorial qualities,
spatial relations

B. Linear, step-by-step sequences.
slow and systematic approach

C. Ponders and ruminates

D. Convergent thinking

B. Insight: suddenly sees relationship;
answers occur in a flash. Sees whole
picture: everything suddenly makes
sense; the eureka feeling: "Aha!",
"I've got it!": understanding is
immediate

C. Performs tasks without reflection

D. Divergent thinking

II. Language

Pre-verbal, Non-Verbal, and Quasi-Verbal
Activity

Left Hemisphere

Right Hemisphere

A. Speech used as a logical thinking
tool

A. Expletives and inner speech (no
writing)

B. Concern with format and surface
structure

B. Concern with subtleties and coloring of
language (accompanied by pauses)

C. Formulation of propositions

C. Images, controlling concepts, archetypes,
dreams, etc.

E. Actual writing

E. Sketching, doodling; left-hand gestures

F. Verbal repetition

F. Fragments of inner speech

G. Verbal recall

G. Visual and autobiographical recall

III. Problem Solving

Left Hemisphere

Right Hemisphere

A. Logic; heuristic exploration;
verification: questions,
conditionals, parallelism,
hypothetical opposition; "but",
"if", "because", "unless",
"on the other hand", etc.

A. Illumination: "Aha", sudden awareness;
eureka responses; incubation (finding
ways to avoid speech): Pauses;
repeated "ah's", single words and
phrases often with modification;
coughs, sighs, clearing throat;
lighting cigarette, drinking coffee;
humming; prompt from partner; left hand
gestures, such as waving, fidgeting,
tapping table

Left Hemisphere

- B. Analysis and dissection
- C.,D. Abstractions
- E. Items numbered and sequenced
- F. Reference to constraints of problem (medium, audience, purpose)
- G. Discernible syllogistic and inferential processes
- H. Careful examination of Ideas

Right Hemisphere

- B. Brings Items together suddenly
- C.,D. Concrete terms and Images; personal memory
- E. Disordered, random quality to production
- F. Groping, fumbling, jumping from point to point, withdrawing; tearing out old page and starting anew
- G. Bisociation, Janusian thinking, metaphor, figures of speech, etc.
- H. New Ideas accompanied by insight exclamations.

IV. Other Attributes

Left Hemisphere

- C. Careful, measured speech
- D. Positive evaluations
- E. Intellectual qualities: allusions, references to books, etc.
- F. Humor
- G. Interruptions of attention
- H. Flat, monotonous voice tone
- I. Concern for detail

Right Hemisphere

- C. Excitement in speech; subject displays emotion
- D. Negative evaluations (often unfounded)
- E. Works by "feel" (may include rereading for "slingshot" effect)
- F. Surprise and playfulness
- G. Sustained attention (often as if daydreaming or lost in a trance)
- H. Inflection, melody, and other metalinguistic qualities in voice
- I. Concern for pattern and shape

My original hypothesis assumed that there might be some simple and harmonious relationship amongst creativity, the flexibility set, right hemisphere activity and writer-based prose, on the one hand, and amongst the persistence set, left hemisphere activity and reader-based prose on the other. But even a casual examination of the protocol analogues discloses too much

Incongruity for such a hypothesis to be feasible. After graphing the writing/problem solving activity deducible from the protocols of each subject, these incongruities became even more enormous. For example, two of the inexperienced writers had graphs which were very close to the paradigm we saw earlier and should, therefore, have produced reader-based prose (Figure III is an example); unfortunately, they did not do so. Two other inexperienced writers had graphs which unexpectedly skewed toward a dominance of the persistence set and left-brained activity (Figure IV is an example). All the experienced writers produced reader-based prose, but two had graphs skewed toward the use of the flexibility set and right-brained activity (Figure V is an example), and two had graphs skewed toward the other extreme of dominance of the persistence mode and of left-brained activity (Figure VI is an example).

The way out of this impasse took considerable incubating. Eventually, however, it became clear that I was dealing with four modalities and not two, and that they quite probably represented four rather universal, although not always effective, ways of approaching problems that demand solution through writing. A further analysis of the data had revealed that there were actually two kinds of flexibility set and two kinds of persistence set, each of the four capable of different degrees of influence during the problem solving process. Persistence I and Flexibility I were composed of the best attributes of the general paradigm; those attributes could be employed accurately and effectively at either an extensive or minimal level. In all these instances the left and right hemispheres appeared to have valuable and efficient input at appropriate times and without serious inhibition from the other half; the extent of involvement might, however, vary considerably. Conversely, Persistence II and Flexibility II were composed of the negative attributes and diminished positive attributes of the general paradigm. Although once again there was great variation in the degree of influence, both Flexibility II and Persistence II sets operated ineffectively and incompletely, and the activities of the left and right hemispheres were inhibited at times when they should not have been, all of which affected detrimentally both the writing process and the written product. It appeared, therefore, as if there were at least four separate composing/problem solving processes: 1. The highly creative writer with a

Subject: Monique

1 Unit = 1 Minute

-20-

Persistence →

Flexibility →



FIGURE III

-21-
FIGURE IV

Subject: Robert

1 Unit = 1 Minute



Subject: John
1 Unit = 1 Minute

FIGURE V

-22-

Persistence →

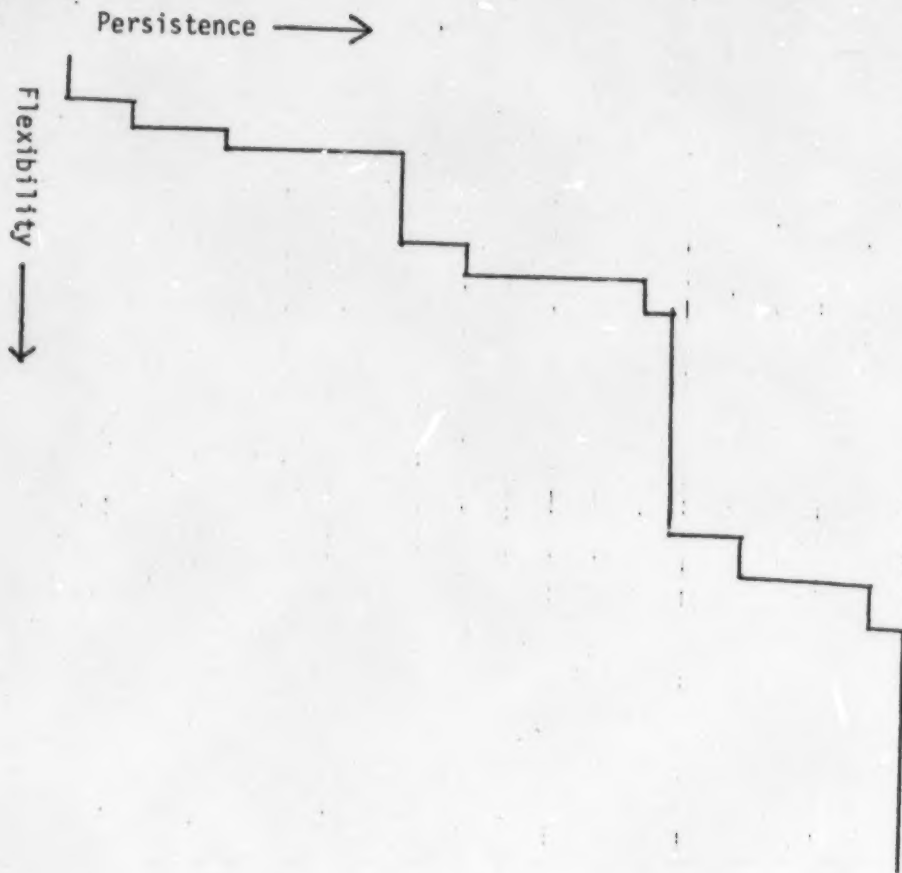
Flexibility →

-23-

FIGURE VI

Subject: Geri

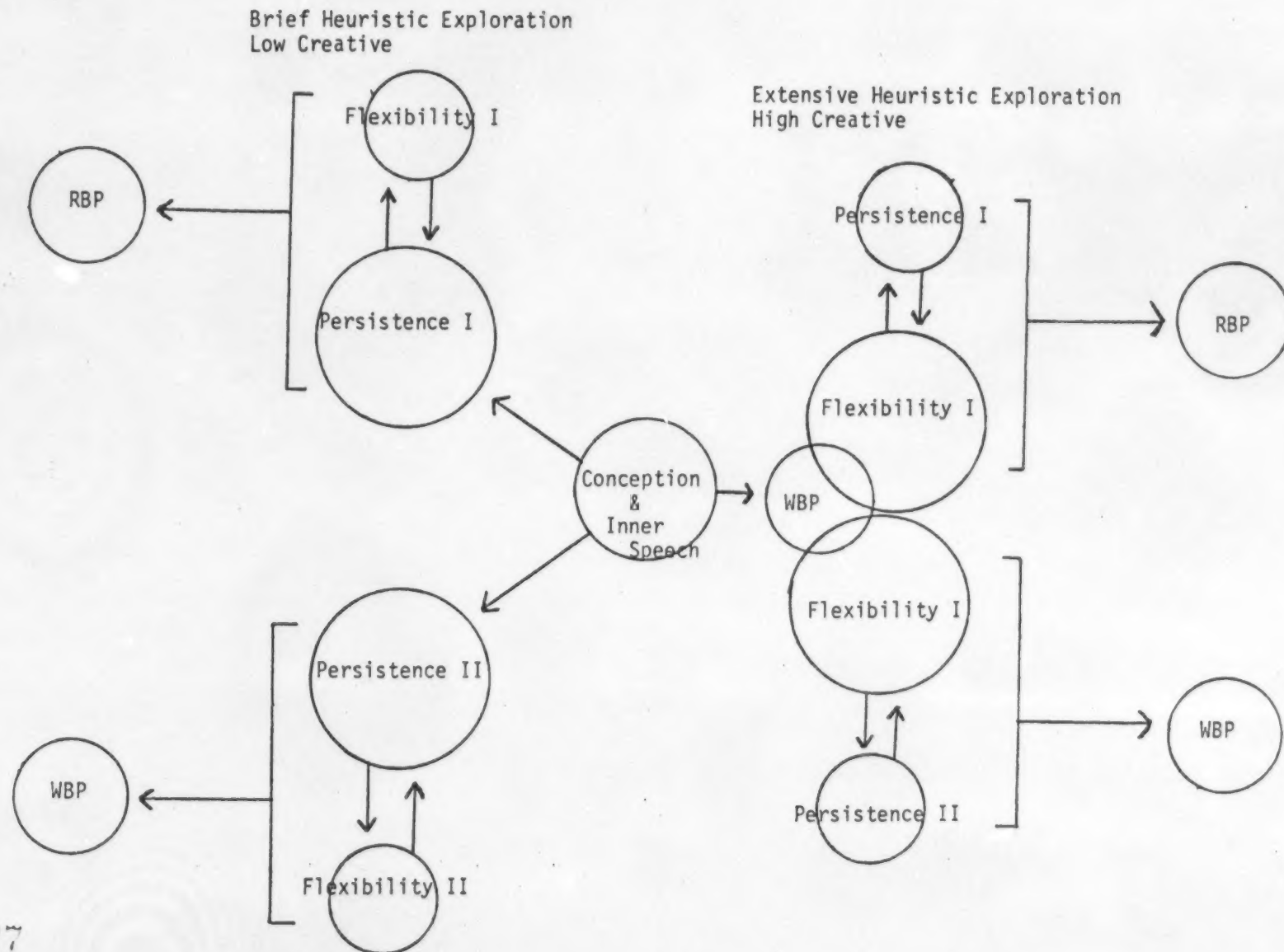
1 Unit = 1 Minute



dominant Flexibility I set and a subordinate Persistence I set, who produced reader-based prose; 2. The highly creative writer with a dominant Flexibility I set and a subordinate type II (Ineffective) Persistence set, who produced writer-based prose; 3. The less creative writer with a dominant Persistence I set and subordinate type I Flexibility set, who produced reader-based prose; 4. The less creative writer with a dominant type II (Ineffective) Persistence set and subordinate type II (Ineffective) Flexibility set, who produced the most egregious examples of writer-based prose (Figure VII).

There is more to harvest from the garden of this study than theory, however and often it is the practical fruit which is most valuable. My examination of the protocols has suggested several specific varieties of advice that might help us help our students better make the transition from writer-based prose to reader-based prose by improving the quality, timing and application of their flexibility and persistence sets: 1. Teach heuristics, such as a simplified version of Young, Becker and Pike's tagmemics; but be aware that even non-data-conditioned heuristics are a bit artificial. Every problem contains within itself its own best method of solution, and what we really need is some kind of meta-heuristic out of which can be derived problem-specific schema and heuristics. In contrast to tagmemics, such a meta-heuristic would probably be quite right-brained, and a thorough exploration of the mystic psychologies of the East might provide a point of departure. 2. Teach framing techniques to aid the writing student in determining the boundaries, finding the core, and mapping the interior of a problem. The obvious corollary is that students should be encouraged to recognize and transcend the cliché and stereotype in both thinking and language. 3. Help students develop what Albert Rothenberg has termed Janusian thinking or "the capacity to conceive and utilize two or more opposite or contradictory ideas, concepts, or images simultaneously." 4. Explain and encourage appropriate incubation. Edward deBono has said that "pouncing on an idea as soon as it appears kills the idea. Too early and too enthusiastic logical attention either freezes the idea or forces it into old moulds." Meditation techniques and mild forms of autohypnosis can facilitate

FIGURE VII



the transfer of an unresolved problem into the right hemisphere. 5. Emphasize the importance of trying to conceive a problem in visual and spatial terms, either by thinking in dynamic images or by sketching. 6. Encourage autobiographical and expressive writing, if not for their own sake, at least as precursors of exposition and persuasion. 7. Provide time for language play, using such synectic techniques as analogy and existential metaphor. 8. Include in your curriculum wide and substantial reading. 9. Show students how to apply probes (questioning techniques) to ideas and propositions, so as to expand a frame of reference and facilitate wide and deep exploration. Burke's dramatistic pentad, in conjunction with hypotheticals and conditionals ("if" questions), is particularly useful. 10. Similarly, show how self-prompting can work to prevent premature closure on an idea or proposition; attaching, for example, a "but", a "because", an "unless", or an "on the other hand" at the end of a statement will encourage new ways of looking at that statement, thus bringing to consciousness a greater number of contextual possibilities and alternatives.

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